

REMARKS

The Examiner's Office action mailed May 6, 2005, has been reviewed. In response thereto, the Applicants submit this Amendment and Response.

Status of the Claims

Claims 1-10 are pending in the application.

Applicants recognize the obligation under 37 CFR § 1.56 to point out all information material to patentability, including invention dates of each claim not commonly owned at the time a later invention was made. Applicants state the invention claimed has been commonly owned by The Charles Machine Works, Inc., at all times.

Applicants have amended the first paragraph of the specification and claim 1 to correct typographical errors. Claim 7 has been rewritten in independent form. New claims 11-17 have been added as dependent from claim 7. No new matter has been added and Applicants submit that all claims in the application are now in condition for allowance.

35 U.S.C. § 102(e) Rejection

The Examiner rejected claims 1, 5, and 8 under 35 U.S.C. § 102(e) as being anticipated by PCT Publication No. 02/079603, owned by Tracto-Technik. Reconsideration of this rejection is respectfully requested.

Independent claim 1 is directed to a makeup/breakout system for use with a horizontal boring machine. The machine is comprised of a drive system, a drill string, and a spindle. The drive system is comprised of a drive frame, a mounted rotation drive, and a rotation shaft driven by the rotation drive and characterized by an amount of axial float. The makeup/breakout system comprises a biasing member, a float sensor, and a connection controller. The biasing member is positioned to urge the rotation shaft to a center float position. The float sensor is adapted to determine the amount of float in the rotation shaft and to transmit a float signal. The connection controller is adapted to receive the float signal and to coordinate thrust and rotation in response to the float signal.

The Tracto-Technik reference illustrates a device and method for screwing together lengths of drill rods for horizontal drilling. The Tracto-Technik discloses a system for connecting a new drill rod 6 to a drill string, the system comprising a rotary drive 1 and a drive shaft 3 having a drill rod adapter 4. The drive 1 and drive shaft 3 are characterized by an amount of play, and a spring 30 is used to keep the play in its extended position. See p.5, ¶9. A transmitter 20 and sensors 22, 24 are used to indicate when the play between the drive 1 and the drive shaft 3 is such that the drive shaft is in a preloaded position for screwing into the drill rod or screwing out from the drill rod. See p.6, ¶2. That preloaded position is when the play, or float, is at its end limits, so that the spring 30 is fully extended or compressed. The Tracto-Technik reference does not show, however, a biasing member to urge the rotation shaft to a *center* position, as Applicants' claim 1 requires.

In operation, the drill rod 6 of the Tracto-Technik system is added to the drill string by advancing the drive shaft 3 until the drill rod adapter 4 contacts the drill rod. The shaft 3 and adapter 4 are then "moved a bit closer in the direction of the length of drill 6 in order to pretension the spring to facilitate the screwing in of the thread 40 into the receptacle 60 *without* further moving of the carriage 2...." See p.5, ¶9-p.6, ¶1. The transmitter 20 and sensors 22, 24 indicate when the drive shaft is in a preloaded position for screwing the adapter 4 to the drill rod 6. See p.6, ¶3. With the drive shaft 3 and the drill rod adapter 4 in place, the rotary drive 1 rotates the drill rod adapter to facilitate the connecting, and the spring 30 provides the forward movement for the adapter 4. The Tracto-Technik reference suggests a control 26 may be used to automate this approach and screwing in of the adapter. See p.6, ¶6. The process, and the control 26, of Tracto-Technik, only could be used to thrust until the drive shaft 3 was at one extreme position and then rotate until the drive shaft 3 was at the other extreme position, but not operating both functions simultaneously and may be used for "switching on or off of a percussion drive." See p.4, ¶¶2,4. But the Tracto-Technik reference does not teach or suggest a connection controller that *coordinates* the thrust and rotation in response to a float signal. Consequently, Tracto-Technik does not disclose a biasing member to urge the rotation shaft to a

center float position and a controller that coordinates thrust and rotation, as claim 1 of the instant application requires. Therefore, claim 1 is not anticipated by the Tracto-Technik reference and the 35 U.S.C. § 102(e) rejection of this claim must be withdrawn.

Claims 5 and 8 depend from claim 1 and include all of its features. Thus, these dependent claims likewise are allowable and the 35 U.S.C. § 102(e) rejection of these claims must be withdrawn.

35 U.S.C. § 103(a) Rejection

The Examiner rejected claim 6 under 35 U.S.C. § 103(a) as being unpatentable over Tracto-Technik, PCT Publication No. 02/079603. Reconsideration of this rejection is respectfully requested.

Dependant claim 6 depends from claim 1. As discussed above, claim 1 is directed to a makeup/breakout system comprising a biasing member, a float sensor, and a connection controller. The biasing member is positioned to urge the rotation shaft to a center float position. The float sensor is adapted to determine the amount of float in the rotation shaft and to transmit a float signal. The connection controller is adapted to receive the float signal and to coordinate thrust and rotation in response to the float signal.

As previously described, the Tracto-Technik reference discloses a system for connecting a new drill rod 6 to a drill string and comprises a rotary drive 1 and a drive shaft 3 having a drill rod adapter 4. The play between the drive 1 and the drive shaft 3 is kept in an extended position by a spring 30. See p.5, ¶9. A transmitter 20 and sensors 22, 24 indicate when the play between the drive 1 and the drive shaft 3 is such that the drive shaft is in a preloaded position for screwing into the drill rod or screwing out from the drill rod. See p.6, ¶2. That preloaded position is when the play, or float, is at its end limits, so that the spring 30 is fully extended or compressed. The Tracto-Technik reference does not show, then, a biasing member to urge the rotation shaft to a *center* position, as Applicants' claim 1 requires.

The operation of the Tracto-Technik system adds the drill rod 6 to the drill string by advancing the drive shaft 3 until the drill rod adapter 4 contacts the drill rod. The shaft 3 and


adapter 4 are then “moved a bit closer in the direction of the length of drill 6 in order to pretension the spring to facilitate the screwing in of the thread 40 into the receptacle 60 *without* further moving of the carriage 2....” See p.5, ¶9-p.6, ¶1. The transmitter 20 in combination with the sensors 22, 24 indicates when the drive shaft is in the preload position for screwing the adapter 4 to the drill rod 6. See p.6, ¶3. With the drive shaft 3 and the drill rod adapter 4 in place, the rotary drive 1 rotates the drill rod adapter to facilitate the connecting, and the spring 30 provides the forward movement for the adapter 4. The Tracto-Technik reference suggests a control 26 may be used to automate this approach and screwing in of the adapter. See p.6, ¶6. The process and the control 26 of Tracto-Technik operates either thrust or rotation as a result of reaching the predetermined axial displacement of the drive shaft 3, but does not allow them to be operated simultaneously. See p.4, ¶¶2. But the Tracto-Technik reference does not teach or suggest a connection controller that *coordinates* the thrust and rotation in response to a float signal. Consequently, Tracto-Technik does not disclose a biasing member to urge the rotation shaft to a center float position and a controller that coordinates thrust and rotation, as claim 1 of the instant application requires. Therefore, claim 1 is patentable over the Tracto-Technik reference. Thus, claim 6 is also not obvious in view of the Tracto-Technik reference and the 35 U.S.C. § 103(a) rejection of this claim must be withdrawn.

Applicants appreciate the Examiners indication that claims 2-4, 7, 9, and 10, would be allowable if rewritten in independent form. Claim 7 has been rewritten in independent form. New claims 11-17, corresponding to claims 2-4 and 8-10 have been added to depend from claim 7. No new matter has been added.

Applicants submit that the instant application, as amended herein, is in condition for allowance. Applicants’ representative would welcome the opportunity to discuss the case with the Examiner in the event that there are any questions or comments concerning the application or this Amendment.

This is intended to be a complete response to the Office Action mailed May 6,
2005.

Respectfully submitted,



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